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Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) Publication number:

**0 648 833 A1**

(12)

**EUROPEAN PATENT APPLICATION**  
**published in accordance with Art.**  
**158(3) EPC**

(21) Application number: **94910565.4**

(51) Int. Cl.<sup>6</sup>: **C11D 1/37, C11D 1/10,**  
**C11D 1/04, A61K 7/50,**  
**A61K 7/075**

(22) Date of filing: **30.03.94**

(86) International application number:  
**PCT/JP94/00514**

(87) International publication number:  
**WO 94/22994 (13.10.94 94/23)**

(30) Priority: **30.03.93 JP 72005/93**

(43) Date of publication of application:  
**19.04.95 Bulletin 95/16**

(84) Designated Contracting States:  
**AT BE CH DE DK ES FR GB GR IE IT LI LU MC**  
**NL PT SE**

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(54) **DETERGENT COMPOSITION.**

(57) A detergent composition comprising a salt (A) of an N-acyl derivative of an amino acid selected from glycine, alanine and  $\beta$ -alanine and a salt (B) of a higher fatty acid in a weight ratio of component (A) to component (B) of 99.5/0.5 to 90/10, wherein the acyl residue is a residue of a C<sub>8</sub>-C<sub>20</sub> (un)saturated fatty acid; and another detergent composition which contains a higher alcohol and/or a polyhydric alcohol in addition to the above components. The invention serves to improve the performance of N-acylated amino acid salts as the detergent.

**EP 0 648 833 A1**

(Technical Field)

This invention relates to a detergent composition which comprises an N-acyl glycine salt, an N-acyl alanine salt and/or an N-acyl  $\beta$ -alanine salt, together with a higher fatty acid salt, and to another detergent composition whose use feeling is improved by incorporating further a higher alcohol and/or a polyhydric alcohol.

(Background Art)

N-Acyl amino acid salts are known as surface active agents generally having high safety, and, particularly, N-acyl glutamic acid salts, N-acyl sarcosine salts, N-acyl  $\beta$ -alanine salts, N-acyl methyl taurine salts and the like are broadly used in detergents. Other N-acyl amino acid salts have also been studied since considerably old times, and N-acyl amino acids were actually synthesized from and examined on natural amino acids and synthetically obtainable amino acids. Especially, there are a number of reports on the results of studies on N-acyl derivatives of natural amino acids.

Recently, it was reported that scum formed by the reaction of an N-acyl glycine salt, an N-acyl  $\beta$ -alanine salt or the like with calcium contained in city water was found to have an excellent touch (Japanese Patent Application Laid-Open (Kokai) No. Hei 4-221607). However, the N-acyl amino acid salts disclosed in this report and other natural type N-acyl amino acid salts were not sufficient in their bubble-related performances in terms of bubble retention, creaminess, lathering power and sliminess.

The object of the present invention is to provide an excellent detergent composition comprising an N-acyl amino acid salt, which is highly safe and shows quick, effective and creamy lathering and reduced slimy touch to the skin.

(Disclosure of the Invention)

With the aim of achieving the aforementioned object, the inventors of the present invention have conducted intensive studies and found as the result that an excellent detergent composition having the aforementioned properties can be provided by jointly using a salt of a specified N-acyl amino acid and a salt of a specified higher fatty acid, or by blending further then with a specified higher alcohol and/or polyhydric alcohol, and finally accomplished the present invention on the basis of such findings.

Accordingly, the present invention relates to a detergent composition which comprises (A) an N-acyl amino acid salt of an amino acid selected from glycine, alanine and  $\beta$ -alanine where the acyl group is a fatty acid residue having 8 to 20 carbon atoms and (B) a higher fatty acid salt having 8 to 20 carbon atoms at a Component (A)/Component (B) weight ratio of 99.5/0.5 to 90/10, and to another detergent composition derived from the above composition, which comprises further a higher alcohol and/or polyhydric alcohol.

The present invention will be described in detail as follows.

With regard to N-acyl amino acid salts as Component (A) of the detergent composition of the present invention, the N-acyl amino acid moiety is composed of an amino acid selected from glycine, alanine and  $\beta$ -alanine and an acyl group which is a saturated or unsaturated fatty acid residue having 8 to 20 carbon atoms. Examples of such moiety include lauroyl glycine, cocoyl glycine, myristoyl glycine, palmitoyl glycine, stearoyl glycine, oleoyl glycine, lauroyl  $\beta$ -alanine, cocoyl  $\beta$ -alanine, myristoyl  $\beta$ -alanine, palmitoyl  $\beta$ -alanine, stearoyl  $\beta$ -alanine, oleoyl  $\beta$ -alanine, lauroyl alanine, cocoyl alanine, myristoyl alanine, palmitoyl alanine, stearoyl alanine and the like. These N-acyl amino acids may be of either optically active form or racemic form. On the other hand, examples of the base moiety include alkali metals such as sodium, potassium and the like, organic amines such as triethanolamine, diethanolamine, monoethanolamine and the like, alkanol amines and basic amino acids such as lysine, ornithine, arginine and the like. These base moieties may be used as a combination of two or more, because such a combination may further improve lathering and bubble retention.

With regard to higher fatty acid salts as Component (B), examples of the higher fatty acid moiety include straight- or branched chain, saturated or unsaturated ones each having 8 to 20 carbon atoms, particularly lauric acid, myristic acid, palmitic acid, stearic acid, coconut oil fatty acids, hardened tallow fatty acids and oleic acid, while the base moiety may be selected from the aforementioned base moieties of the Component (A) N-acyl amino acid salts.

As a matter of course, the aforementioned N-acyl amino acid salts may be used alone or as a mixture of two or more. The aforementioned higher fatty acid salts can also be used in the same manner.

With regard to the ratio (by weight) of Components (A) and (B) to be comprised in the detergent composition of the present invention, bubble quality is rough, bubble retention is poor and bubble volume is

insufficient when Component (A)/Component (B) = 100/0. The bubble volume-increasing effect of Component (B) becomes significant and the bubble retention, creaminess of bubble quality, non-sliminess and bubble-breaking capacity become appropriate when the ratio is adjusted to the Component (A)/Component (B) = 99.5/0.5, the bubble retention becomes relatively good when the Component (A)/Component (B) = 98/2, and almost constant effects are obtained when the Component (A)/Component (B) = 97/3. The ratio if exceeding the Component (A)/Component (B) = 90/10 would cause rapid increase in the generation of unusual smells and jarring touch, thus spoiling feeling of the detergent composition when used.

Jarring touch does not occur and refreshed feeling is improved when a specified higher alcohol is jointly used in addition to the active ingredients composed of the specified N-acyl amino acid salt and the specified higher fatty acid salt.

Such higher alcohols can be straight- or branched-chain, saturated or unsaturated alcohols having 8 to 24 carbon atoms. Examples of such higher alcohols include, especially, lauryl alcohol, myristyl alcohol, stearyl alcohol, cetanol, cetostearyl alcohol and the like. As a matter of course, these higher alcohols can be used alone or jointly as a mixture of two or more, and the joint use will exert the effect in smaller amounts.

With regard to the amount of the higher alcohol (total amount when used as a mixture), 0.5 to 20% by weight based on the total amount of Components (A) and (B) may be effective, and amounts outside this range will not bear refreshed feeling.

In addition, hardening and dry-and-rough feeling of the skin and hair and stiffness of the skin can be prevented when a polyhydric alcohol is jointly used in addition to the active principle composed of the specified N-acyl amino acid salt and the specified higher fatty acid salt.

Such polyhydric alcohol to be used herein can be those alcohols which have 2 or more hydroxyl groups in one molecule. Examples include glycerol, 1,3-butylene glycol, octanediol, ethylene glycol, diethylene glycol, polyethylene glycol, propylene glycol, dipropylene glycol, polypropylene glycol, isoprene glycol, maltitol, sorbitol, pentaerythritol and the like. Of these, glycerol, 1,3-butylene glycol and propylene glycol are preferred from the view point of the use feeling and bubble volume.

Amounts of the polyhydric alcohol to be blended may be in the range of from 3 to 30% by weight, preferably from 5 to 20% by weight, of the total composition. The amount if smaller than 3% would bear no effect of its blending, and if larger than 30% would result in poor bubble quality and inferior use feeling.

With regard to the pH value of the detergent composition of the present invention, a pH value of from 6 to 10 to be provided at the time of the use of the composition is preferable from the safety point of view, and a pH value of from 6.5 to 9 is more desirable in view of the use feeling and lathering property. In consequence, the detergent composition of the present invention may be used as such if the pH value upon dissolution in water is within the above range, though it varies depending on the type of the base moiety of the N-acyl amino acid salt, but, when the value is outside the above range, a pH adjusting agent such as citric acid, carbonate or the like should have preferably been blended in advance so that the pH value is set within the range when it is used.

The detergent composition of the present invention may be made into appropriate preparation forms as detergents with no particular limitation, such as liquids, pastes, solids, powders and the like.

Also, as a matter of course, the detergent composition of the present invention can comprises such additives as commonly used in cosmetics and detergents, such as drugs, bactericides, perfumes, pigments and the like, corresponding to each application purpose, and within such a range that they do not spoil the characteristics of the present invention.

The detergent composition of the present invention shows a significant synergistic effect in terms of the bubble performance when used jointly with other anionic, nonionic and amphoteric surface active agents.

#### (Brief Description of the Drawings)

Fig. 1 shows a graph showing the results of Test Example 1.

#### (Best Mode of Carrying Out the Invention)

The following examples are provided to further illustrate the present invention.

#### Test Example 1:

N-Lauroyl glycine was synthesized in accordance with the well known Schotten-Baumann reaction, and the unreacted fatty acid and other impurities were removed from the reaction product by recrystallization to obtain highly by purified N-lauroyl glycine (purity, 99.95% or more), which was subsequently neutralized

with potassium hydroxide to obtain the potassium salt of N-lauroyl glycine.

Using the thus obtained potassium salt of N-lauryl glycine (Component (A)) and potassium myristate (Component (B)) in varied amounts, several aqueous solutions (pH 8.2), each containing the components in a total concentration (surfactant concentration) of 0.5% by weight, were prepared. A 50 g portion of each aqueous solution was taken and stirred in a domestic mixer "Milcer" (manufactured by Iwatani Sangyo) to examine retention of bubbles. The retention is defined based on the formula, (bubble volume (ml) after 10 minutes' stirring)/(bubble volume (ml) just at starting point)  $\times$  100.

Another test was carried out on the retention of bubbles completely in the same manner except that potassium laurate was used instead of potassium myristate.

The results are shown in Fig. 1. As is evident from the figure, N-acyl amino acid salt alone cannot show sufficient retention of bubbles, while the bubble retention is improved when a very small amount of a higher fatty acid salt is added to the N-acyl amino acid salt (reaching almost the maximum level by the addition of about 2% of the higher fatty acid salt).

In order to evaluate creaminess, bubbles collected just after lathering at Points P and Q in Fig. 1 were placed on a slide glass, covered with cover glasses and then observed under a fiber scope microscope "Scopeman" (manufactured by Moritex), simultaneously taking photographs. As the result, it was found that the bubbles collected at Point P where a small amount of the fatty acid salt had been added were excellent in creaminess, while the bubbles collected at Point Q where the fatty acid salt had not been added were confirmed to be unstable, because they united during the microscopic observation.

Inventive Examples 1 to 10 and Comparative Examples 1 to 7:

Various types of N-acyl amino acid salts were prepared in the same manner as described in Test Example 1.

Using the thus prepared N-acyl amino acid salts and higher fatty acid salts and higher alcohols in such varied amounts as shown in Table 3, a number of aqueous solutions, each containing these components in a total concentration (surfactant concentration) of 0.5% by weight, were prepared. The pH value of each solution was found to be 7 to 8. Each of the thus prepared solutions was stirred using the domestic mixer used in Test Example 1 to examine the test items shown in Table 1.

Table 1

Test item	Description
Bubble volume	bubble volume (ml) after 5 seconds' stirring
Lathering rate	⊙: very quick, ○: quick, Δ: usual, x: not sufficient
Creaminess of bubbles	⊙: very creamy, ○: creamy, Δ: usual, x: not sufficient
Retention of bubbles	retention (%) = (bubble volume (ml) after 10 minutes)/(bubble volume (ml) after 5 seconds' stirring) $\times$ 100

The compositions of the present invention were evaluated as head hair and body detergents by organoleptic tests by 20 expert panelists composed of 10 females and 10 males, concerning the touch of bubbles, jarring feeling, refreshed feeling and sliminess after washing, and the smells at the time of washing as the sense of touch and feeling. The organoleptic hand-washing and hair-washing tests were carried out using test solutions prepared by diluting each of the compositions having varied blending ratios shown in Table 3 with distilled water to a surfactant concentration of 30% or 15%.

The criteria for evaluation of each test item is shown in Table 2.

Table 2

Test item	Description
Touch of bubbles	⊙ : very good, ○ : good, Δ : usual, and X : bad.
Jarring feeling (hands)	⊙ : very smooth, ○ : smooth, Δ : jarring, and X : extremely jarring.
Jarring feeling (hair)	⊙ : very smooth, ○ : smooth, Δ : jarring, and X : extremely jarring.
Refreshed feeling	⊙ : very refreshed, ○ : refreshed, Δ : usual, and X : slimy.
Sliminess	○ : not slimy, and X : slimy.
Smells	⊙ : not feel at all, ○ : hardly feel, Δ : usual, and X : unpleasant smells.

The results are shown in Table 3.

Table 3

		Inventive Examples						
		1	2	3	4	5		
20	Acyl amino acid salt	Lauroyl glycine TEA *	95					
		Lauroyl glycine sodium		92				
		Myristoyl glycine potassium			90			
25		Lauroyl alanine TEA				90		
		Lauroyl β-alanine potassium				90		
30	Higher fatty acid salt	Sodium laurate			10			
		Potassium laurate		8				
		Coconut oil fatty acid TEA	5		10			
		Potassium myristate				10		
35	Higher alcohol	Cetanol						
		Lauryl alcohol						
40	Results	Bubble volume (ml)	300	310	320	315	300	
		Lathering rate	⊙	⊙	⊙	⊙	⊙	
		Creaminess of bubbles	⊙	⊙	⊙	⊙	⊙	
		Retention of bubbles (%)	98	95	99	97	100	
		Touch of bubbles	○	○	⊙	⊙	⊙	
		45	Sliminess	○	○	○	○	○
			Jarring feeling (hands)	⊙	⊙	⊙	⊙	⊙
			Jarring feeling (hair)	⊙	⊙	⊙	⊙	⊙
		50	Refreshed feeling	○	○	○	○	○
			Smells	⊙	⊙	⊙	⊙	⊙

\*: TEA = triethanolamine

Table 3 (continued)

		Inventive Examples				
		6	7	8	9	10
Acyl amino acid salt	Lauroyl glycine TEA	90				
	Lauroyl glycine sodium		92			
	Mvristoyl glycine potassium			90		
	Lauroyl alanine TEA				90	
	Lauroyl β-alanine potassium					90
Higher fatty acid salt	Sodium laurate				7	
	Potassium laurate		5			
	Coconut oil fatty acid TEA	5		7		
	Potassium mvristate					2
Higher alcohol	Cetanol	5	3		3	
	Lauryl alcohol			3		8
Results	Bubble volume (ml)	300	270	270	300	300
	Lathering rate	⊙	⊙	⊙	⊙	⊙
	Creaminess of bubbles	⊙	⊙	⊙	⊙	⊙
	Retention of bubbles (%)	100	100	100	99	95
	Touch of bubbles	⊙	⊙	⊙	⊙	⊙
	Sliminess	○	○	○	○	○
	Jarring feeling (hands)	⊙	⊙	⊙	⊙	⊙
	Jarring feeling (hair)	⊙	⊙	⊙	⊙	⊙
	Refreshed feeling	⊙	⊙	⊙	⊙	⊙
	Smells	⊙	⊙	⊙	⊙	⊙



Table 3 (continued)

		Comparative Examples						
		1	2	3	4	5	6	7
5	Acyl amino acid salt	Lauroyl glycine TEA	100					
		Lauroyl glycine sodium		100				
		Myristoyl glycine potassium			100		86	
		Lauroyl alanine TEA			100			
		Lauroyl $\beta$ -alanine potassium				100		
10	Higher fatty acid salt	Sodium laurate						100
		Potassium laurate					14	
		Coconut oil fatty acid TEA						
		Potassium myristate						
15	Higher alcohol	Cetanol						
		Lauryl alcohol						
20	Results	Bubble volume (ml)	270	270	270	240	270	270
		Lathering rate	x	x	x	x	⊙	⊙
		Creaminess of bubbles	x	x	Δ	x	⊙	⊙
		Retention of bubbles (%)	60	68	74	75	65	95
		Touch of bubbles	Δ	Δ	Δ	Δ	⊙	⊙
		Sliminess	x	x	x	x	○	○
		Jarring feeling (hands)	⊙	⊙	⊙	⊙	Δ	x
		Jarring feeling (hair)	⊙	⊙	⊙	⊙	Δ	x
		Refreshed feeling	Δ	Δ	Δ	Δ	○	⊙
		Smells	○	○	○	○	x	x

Inventive Examples 11 to 21 and Comparative Examples 8 to 18:

In order to examine the effects of the joint use of the detergent composition of the present invention with other surface active agents, physical property measurement and organoleptic tests were carried out in the same manner as described in the preceding inventive examples. In this case, each aqueous solution was prepared by weighing the respective surface active agents in the amount (g) shown in Table 4 and adding purified water to the weighed agents in such an amount that the total weight was adjusted to 100 g. The pH value of each solution was found to be 7 to 8.

The results are shown in Table 4.

Table 4

		Inventive Examples					
		11	12	13	14	15	16
Acyl amino acid salt	Cocoyl glycine TEA	5	10	10			20
	Cocoyl glycine potassium				20	20	
	Cocoyl glycine sodium						
	Lauroyl glycine sodium						
	Cocoyl alanine TEA						
	Cocoyl β-alanine TEA						
Higher fatty acid salt	Coconut oil fatty acid potassium		0.5	0.5			
	Soap base						
	Coconut oil fatty acid TEA	0.5			0.5	1	2.5
	Potassium myristate						
Higher alcohol	Cetanol				0.5		3
	Lauryl alcohol					0.5	
Anionic surface active agent	Lauroyl methyltaurine sodium	5					
	Monolauryl phosphate TEA				2		5
	Sodium cocoyl isethionate						
Ampho-teric surface active agent	Lauryl dimethylaminoacetic acid betaine	8				10	
	2-Lauryl-N-carboxymethyl-N-hydroxyethylimidazolinium betaine		3				
	Coconut oil fatty acid amide propyldimethylaminoacetic acid betaine			3			
	Lauryl dimethylamino-2-hydroxypropyl sulfobetaine				5		
Nonionic surface active agent	Coconut oil fatty acid diethanolamide	2	2	2			3
	Lauryl polyglycoside				1		
Results	Bubble volume (ml)	295	290	290	298	280	310
	Lathering rate	⊙	⊙	⊙	○	⊙	⊙
	Creaminess of bubbles	⊙	⊙	⊙	⊙	⊙	⊙
	Retention of bubbles (%)	88	99	99	99	97	99
	Touch of bubbles	○	⊙	⊙	⊙	⊙	⊙
	Jarring feeling (hands)	⊙	⊙	⊙	⊙	⊙	⊙
	Jarring feeling (hair)	⊙	⊙	⊙	⊙	⊙	⊙
	Sliminess	○	○	○	○	○	○
	Refreshed feeling	○	○	○	⊙	⊙	⊙
	Smells	○	○	○	⊙	○	○

Table 4 (continued)

		Inventive Examples				
		17	18	19	20	21
Acyl amino acid salt	Cocoyl glycine TEA					
	Cocoyl glycine potassium					
	Cocoyl glycine sodium					
	Lauroyl glycine sodium	20	20			
	Cocoyl alanine TEA			25		
	Cocoyl $\beta$ -alanine TEA				25	20
Higher fatty acid salt	Coconut oil fatty acid potassium					
	Soap base	1				
	Coconut oil fatty acid TEA				2.5	
	Potassium myristate		1	2.5		2
Higher alcohol	Cetanol					
	Lauryl alcohol				3	
Anionic surface active agent	Lauroyl methyltaurine sodium					
	Monolauryl phosphate TEA					
	Sodium cocoyl isethionate	5				
Ampho-teric surface active agent	Lauryl dimethylaminoacetic acid betaine					
	2-Lauryl-N-carboxymethyl-N-hydroxyethylimidazolinium betaine					10
	Coconut oil fatty acid amide propyldimethylamino acetic acid betaine					
	Lauryl dimethylamino-2-hydroxypropyl sulfobetaine					
Nonionic surface active agent	Coconut oil fatty acid diethanolamide			5		5
	Lauryl polyglycoside		10		2.5	
Results	Bubble volume (ml)	300	270	270	300	290
	Lathering rate	⊙	⊙	⊙	⊙	⊙
	Creaminess of bubbles	⊙	⊙	⊙	⊙	⊙
	Retention of bubbles (%)	100	100	100	99	95
	Touch of bubbles	⊙	⊙	⊙	⊙	⊙
	Jarring feeling (hands)	⊙	⊙	⊙	⊙	⊙
	Jarring feeling (hair)	⊙	⊙	⊙	⊙	⊙
	Sliminess	○	○	○	○	○
	Refreshed feeling	○	○	⊙	○	○
	Smells	○	○	○	○	○

Table 4 (continued)

		Comparative Examples					
		8	9	10	11	12	13
Acyl amino acid salt	Cocoyl glycine TEA	5					
	Cocoyl glycine potassium						
	Cocoyl glycine sodium						
	Lauroyl glycine sodium			20	20	20	
	Cocoyl alanine TEA		7				25
	Cocoyl β-alanine TEA						
Higher fatty acid salt	Coconut oil fatty acid potassium						
	Sodium laurate						
	Soap base						
	Coconut oil fatty acid TEA						
	Potassium myristate						
Higher alcohol	Cetanol		0.5				
	Lauryl alcohol						
Anionic surface active agent	Lauroyl methyltaurine sodium	5					
	Monolauryl phosphate TEA		2				
	Sodium cocoyl isethionate				5		
Ampho-teric surface active agent	Lauryl dimethylaminoacetic acid betaine	8					
	2-Lauryl-N-carboxymethyl-N-hydroxyethylimidazolinium betaine						
	Coconut oil fatty acid amide propyldimethylamino acetic acid betaine						
	Lauryl dimethylamino-2-hydroxypropyl sulfobetaine		5				
Nonionic surface active agent	Coconut oil fatty acid diethanolamide	2					5
	Lauryl polyglycoside		1	10		10	
Results	Bubble volume (ml)	270	240	230	240	250	235
	Lathering rate	◎	Δ	Δ	Δ	Δ	Δ
	Creaminess of bubbles	×	×	×	×	×	×
	Retention of bubbles (%)	60	64	63	67	68	64
	Touch of bubbles	Δ	Δ	Δ	Δ	Δ	Δ
	Jarring feeling (hands)	○	×	◎	◎	◎	◎
	Jarring feeling (hair)	◎	◎	×	Δ	Δ	○
	Sliminess	×	×	×	×	×	×
	Refreshed feeling	×	×	×	×	×	×
	Smells	○	○	○	○	○	○

Table 4 (continued)

		Comparative Examples					
		14	15	16	17	18	
5	Acyl amino acid salt	Cocoyl glycine TEA			85		
		Cocoyl glycine potassium				80	
		Cocoyl glycine sodium					85
		Lauroyl glycine sodium					
		Cocoyl alanine TEA					
		Cocoyl $\beta$ -alanine TEA	25	20			
10	Higher fatty acid salt	Coconut oil fatty acid potassium				20	
		Sodium laurate					
		Soap base					
		Coconut oil fatty acid TEA			15		
		Potassium myristate					13
15	Higher alcohol	Cetanol					
		Lauryl alcohol					
20	Anionic surface active agent	Lauroyl methyltaurine sodium					
		Monolauryl phosphate TEA					
		Sodium cocoyl isethionate					
25	Ampho-teric surface active agent	Lauryl dimethylaminoacetic acid betaine					
		2-Lauryl-N-carboxymethyl-N-hydroxyethylimidazolinium betaine		10			
		Coconut oil fatty acid amide propyldimethylamino acetic acid betaine					
		Lauryl dimethylamino-2-hydroxypropyl sulfobetaine					
30	Nonionic surface active agent	Coconut oil fatty acid diethanolamide		5			
		Lauryl polyglycoside	5		5		
		Results	Bubble volume (ml)	260	230	300	300
40		Lathering rate	$\Delta$	$\Delta$	$\odot$	$\odot$	$\odot$
		Creaminess of bubbles	x	x	$\odot$	$\odot$	$\odot$
		Retention of bubbles (%)	68	63	99	98	97
		Touch of bubbles	$\Delta$	$\Delta$	$\odot$	$\odot$	$\odot$
		Jarring feeling (hands)	$\odot$	$\odot$	x	x	x
		Jarring feeling (hair)	$\odot$	$\circ$	x	x	x
45		Sliminess	x	x	$\circ$	$\circ$	$\circ$
		Refreshed feeling	x	x	$\odot$	$\odot$	$\odot$
		Smells	$\circ$	$\circ$	x	x	x
50							

55 Inventive Examples 22 and 23 and Comparative Example 19:

In order to examine the effects of pH on the detergent composition of the present invention, detergent compositions of the compositions shown in Table 5 were prepared and their bubble volumes and used

feelings were evaluated. The pH value of each detergent composition was adjusted with potassium hydroxide or citric acid.

Table 5

	Comparative Example	Inventive Examples	
	19	22	23
Potassium lauroyl glycinate	25	25	25
Potassium laurate	1.5	1.5	1.5
Water	balance	balance	balance
pH	5.5	6.5	9.0
Bubble volume (ml)	180	280	320
Stiffness	X	○	○
Retention of bubbles	X	○	○

Used feelings, namely stiffness and bubble retention when the side of the forearm was washed with a nylon towel using each of the above compositions, were evaluated based on the following criteria by 20 expert panelists consisting of 10 females and 10 males.

Stiffness ⊙ : completely no stiffness, ○ : no stiffness, Δ : usual, and X: stiffen.

Bubble retention ⊙ : very good, ○ : good, Δ : usual, and X: not enough.

Inventive Examples 24 to 26:

In order to examine the effects of the addition of polyhydric alcohols to the detergent composition of the present invention, detergent compositions of the compositions shown in Table 6 were prepared and their bubble volumes and used feelings were evaluated.

Table 6

	Inventive Examples		
	24	25	26
Potassium lauroyl glycinate	25	25	25
Potassium laurate	1.5	1.5	1.5
Glycerol	5	25	5
Propylene glycol			10
1,3-Butylene glycol			5
Water	balance	balance	balance
pH	8.2	8.2	8.2
Bubble volume (ml)	310	305	305
Stiffness	⊙	⊙	⊙
Retention of bubbles	○	○	○

Inventive Examples 27 to 31:

In order to examine the effects of N-acyl amino acid salts on the detergent composition of the present invention, detergent compositions of the compositions shown in Table 7 were prepared and their bubble volumes and used feelings were evaluated. The pH value of each of the detergent compositions was adjusted with 25% aqueous solutions of the respective bases mixed at the mixing ratios shown in the table.

Table 7

		Inventive Examples				
		27	28	29	30	31
Lauroyl glycine		25	25	25	25	25
Lauric acid		1.5	1.5	1.5	1.5	1.5
Base	KOH	90	10	25 75	10	90
	NaOH TEA	10	90		90	10
Glycerol		balance	balance	balance	5	10
Propylene glycol					10	
1,3-Butylene glycol					2	
Water					balance	balance
pH		8.5	7.8	7.1	6.8	8.0
Bubble volume (ml)		315	310	300	305	310
Stiffness		○	○	○	⊙	⊙
Bubble retention		⊙	⊙	⊙	⊙	⊙

Inventive Example 32:

Detergent compositions shown in the following Tables 8 to 16 were prepared in the usual way based on various formulations of materials shown in the tables.

Table 8

Body shampoo	
N-Coconut oil fatty acid acyl glycine potassium salt	20 g
Coconut oil fatty acid sodium salt	2
Coconut oil fatty acid diethanolamide	5
Cetanol	1
Sodium chloride	2
Methylparaben	0.2
Sodium benzoate	0.2
Sodium citrate	0.5
Purified water	balance
Total	100 g
pH 8.2	

Table 9

Cleansing foam	
N-Coconut oil fatty acid acyl DL-alanine sodium salt	20 g
Potassium myristate	2
Propylene glycol	4
Cetostearyl alcohol	3
Coconut oil fatty acid diethanolamide	6
Sodium chloride	2
Sodium sulfate	4
Methylparaben	0.2
Sodium benzoate	0.2
Sodium citrate	0.5
Purified water	balance
Total	100 g
pH 8.7	

Table 10

Hair shampoo	
Lauroyl glycine sodium salt	5 g
Sodium laurate	0.4
Sodium polyoxyethylene lauryl sulfate	6
1,3-Butylene glycol	4
Coconut oil fatty acid diethanolamide	7
Sodium chloride	2
Sodium edetate	0.1
Purified water	balance
Total	100 g
pH 7.5	

Table 11

Hair shampoo	
Lauryl dimethylaminoacetic acid betaine	10 g
Myristoyl glycine TEA	10
Myristoyl glycine lysine	7
Palmitic acid TEA	0.7
Glycerol	2.5
1,3-Butylene glycol	2
Coconut oil fatty acid diethanolamide	7
Sodium chloride	2
Sodium edetate	0.1
Purified water	balance
Total	100 g
pH 7.2	



Table 12

Hair shampoo		
5	Coconut oil fatty acid amidopropyl dimethylamino acetic acid betaine	10 g
	Palm kernel oil fatty acid glycine TEA	5
	Stearic acid lysine salt	0.2
	Lauric acid diethanolamide	4
	Myristyl alcohol	1
10	Sodium chloride	2
	1-Menthol	0.1
	Purified water	balance
	Total	100 g
15	pH 7.4	

Table 13

Hair shampoo		
20	Lauryl dimethylamino-2-hydroxypropyl sulfobetaine	12 g
	Myristoyl- $\beta$ -alanine TEA	6
25	Myristic acid lysine salt	0.1
	Glycerol	5
	Lauric acid diethanolamide	4
	Sodium chloride	2
	Herb extract	0.1
30	Purified water	balance
	Total	100 g
	pH 7.0	

Table 14

Syndet bar		
40	Coconut oil isethionic acid sodium salt	60 g
	N-Palm kernel oil fatty acid acyl $\beta$ -alanine potassium salt	25 g
	Coconut oil fatty acid lysine salt	2
	Isoprene glycol	5
	Lauryl glycoside	4
45	Cationized cellulose	0.2
	Trimethylaminoacetic acid betaine	2
	Sodium sulfite	0.05
	Sodium thiosulfate	0.1
50	1-Hydroxyethylidene-1,1-diphosphonic acid Na salt	0.1
	Purified water	balance
	Total	100 g
	pH 7.9	

Table 15

Cleansing liquid	
Palm kernel oil fatty acid glycine lysine salt	15 g
Palm kernel oil fatty acid	1
Sodium laurylsulfate	5
Trehalose	5
Sodium polyacrylate	2
PCA soda	0.1
Purified water	balance
Total	100 g
pH 7.2	

Table 16

Aerosol detergent	
Coconut oil glycine arginine salt	20 g
Coconut oil fatty acid arginine salt	1.5
Lauric acid TEA	0.5
Glycerol	4.5
Sodium polyglutamate	0.1
Coconut oil fatty acid ethanolamide	3
Sodium chloride	2
Butylparaben	0.2
Sodium benzoate	0.2
Sodium citrate	0.5
Propellant	10
Purified water	balance
Total	100 g
pH 7.6	

## (Industrial Applicability)

The considerable improvement of the properties of N-acyl amino acid salts as detergents thus achieved by the present invention has rendered possible easy provision of excellent detergent compositions.

## Claims

1. A detergent composition which comprises (A) an N-acyl amino acid salt of an amino acid selected from glycine, alanine and  $\beta$ -alanine where the acyl group is a fatty acid residue having 8 to 20 carbon atoms and (B) a higher fatty acid salt having 8 to 20 carbon atoms at a Component (A)/Component (B) weight ratio of 99.5/0.5 to 90/10.
2. The detergent composition of claim 1 which comprises, in addition to said Components (A) and (B), further a higher alcohol having 8 to 24 carbon atoms in an amount of from 0.5 to 20% by weight based on the total amount of the Components (A) and (B).
3. The detergent composition of claim 1 which has a pH value of from 6.5 to 9.
4. The detergent composition of claim 1 which comprises further a polyhydric alcohol.

5. The detergent composition of claim 1 which said N-acyl amino acid salt is a combination of at least two salts selected from the group consisting of the sodium, potassium, triethanolamine, diethanolamine, monoethanolamine, lysine, ornithine and arginine salts.

5 6. The detergent composition of claim 1 which comprises one or more surface active agents selected from anionic (excluding the Component (A) N-acyl amino acid salts), nonionic and amphoteric surface active agents.

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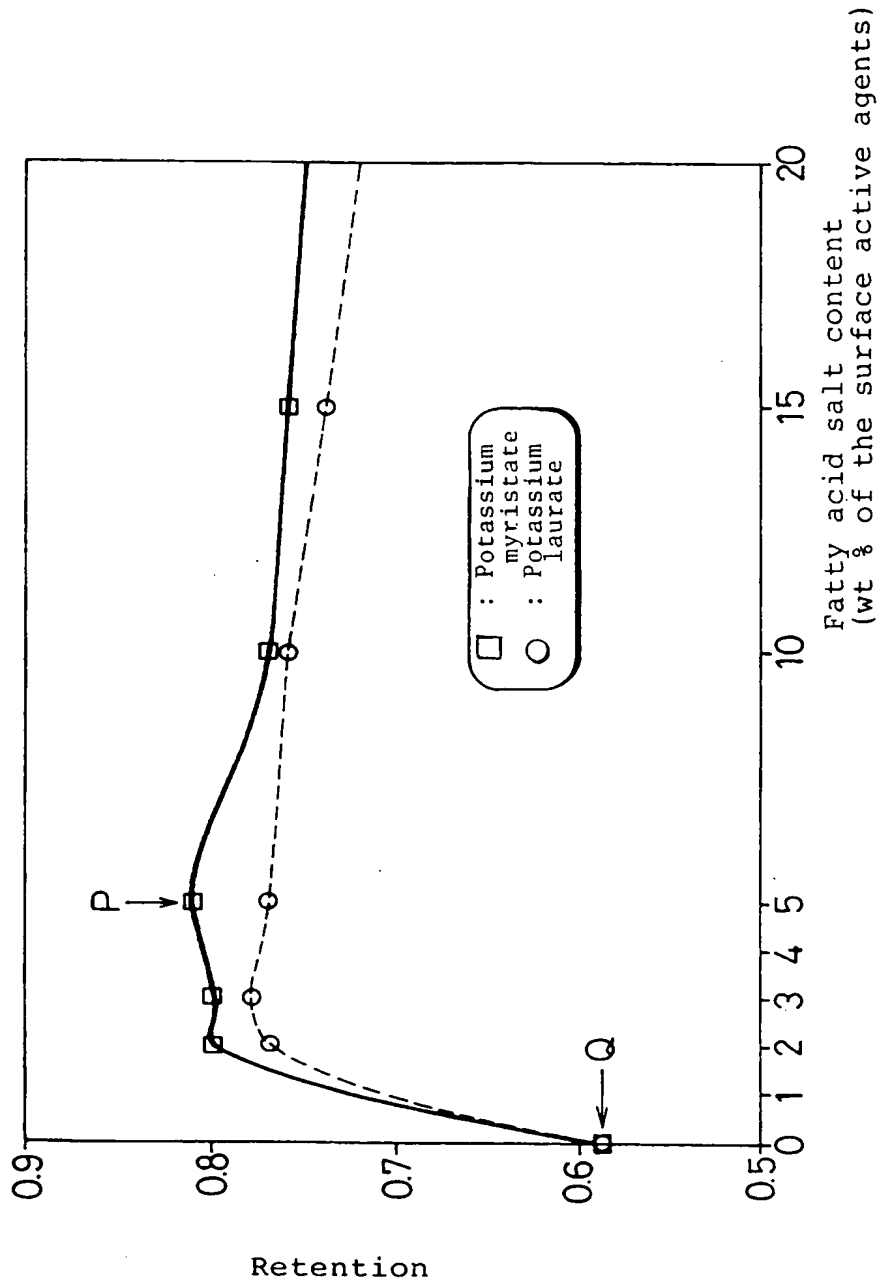
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Fig. 1



EFFECTS OF THE ADDITION OF FATTY ACID SALTS TO  
POTASSIUM LAUROYL GLYCINATE, ON THE RETENTION OF BUBBLES

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP94/00514

## A. CLASSIFICATION OF SUBJECT MATTER

Int. C1<sup>5</sup> C11D1/37, C11D1/10, C11D1/04, A61K7/50, A61K7/075

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int. C1<sup>5</sup> C11D1/37, C11D1/10, C11D1/04, A61K7/50, A61K7/075

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP, A, 4-211607 (Kao Corp.), August 3, 1992 (03. 08. 92), Claim, lines 34 to 39, right column, page 2, lines 22 to 35, right column, page 3, lines 33 to 34, left column, page 4, example 3 & EP, A2, 460566	1-6
A	JP, A, 51-31706 (Kao Corp.), March 18, 1976 (18. 03. 76), Claim, (Family: none)	1-6

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"&amp;" document member of the same patent family

Date of the actual completion of the international search

June 13, 1994 (13. 06. 94)

Date of mailing of the international search report

July 5, 1994 (05. 07. 94)

Name and mailing address of the ISA/

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Form PCT/ISA/210 (second sheet) (July 1992)

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